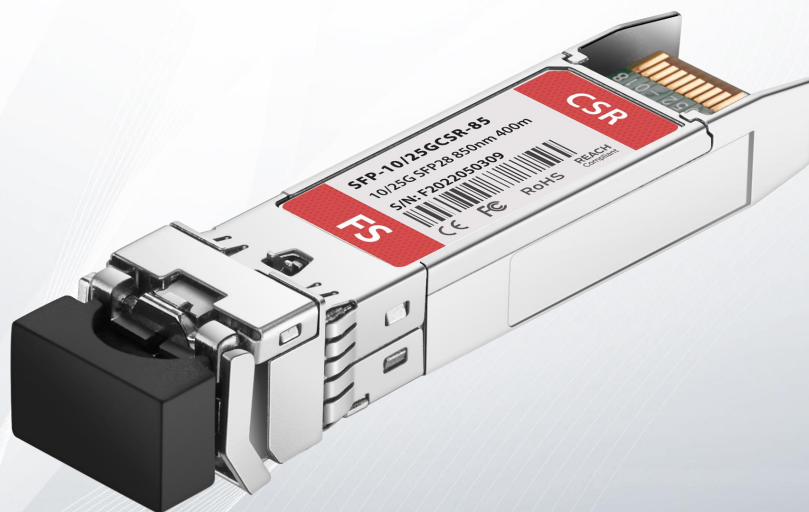


# 10/25GBASE-CSR SFP28 850nm 400m Duplex LC Transceiver

SFP-10/25GCSR-85



## Application

- 25G BASE-SR Ethernet
- 10G Ethernet

## Standards

- SFF-8472
- SFF-8024
- SFF-8431
- SFF-8432

## Features

- Supports 25.78Gb/s Bit Rate
- Hot-pluggable SFP+ Footprint
- 850nm VCSEL Laser and PIN Photo-detector
- Internal CDR on Transmitter and Receiver Channel
- Link Lengths at 25.78G 400m over OM4 MMF
- Link Lengths at 25.78G 300m over OM3 MMF
- LC Duplex Connector
- Low Power Consumption < 1W
- 0~70°C Operating Temperature Range
- Single 3.3V ± 5% Power Supply
- Programmable TX Input Equalizer
- Programmable RX

## Product Description

The 25GCSR 400M short-wavelength transceiver is designed for use in 25.78Gb/s data rate over multimode fiber. The Transceiver is compliant with SFF-8431, and the mechanical SFP+ plug is compatible with SFF-8432. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

## Product Specifications

### I. Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device.

Parameter	Symbol	Min.	Max.	Unit
<b>Storage Temperature Range</b>	$T_S$	-40	85	°C
<b>Relative Humidity</b>	RH	0	85	%
<b>Supply Voltage</b>	$V_{CC}$	-0.3	4	V

### II. Recommended Operating Conditions

Parameter	Symbol	Unit	Min.	Typical	Max.
<b>Operating Case Temperature Range</b>	$T_C$	°C	0		70
<b>Power Supply Voltage</b>	$V_{CC}$	V	3.14	3.3	3.46
<b>Bit Rate</b>	BR	Gb/s		25.78	
<b>Bit Error Ratio</b>	BER				5*10E-5
<b>Max. Supported Link Length</b>	L	m			300 OM3 400 OM4

### III. Electrical Characteristics

Parameter	Symbol	Unit	Min.	Typical	Max.	Note
<b>Supply Voltage</b>	$V_{CC}$	V	3.14	3.3	3.46	
<b>Supply Current</b>	$I_{CC}$	mA			230	
<b>Transmitter</b>						
<b>Input Differential Impedance</b>	$R_{IN}$	$\Omega$	80	100	120	1
<b>Single Ended Data Input Swing</b>	$V_{IN}$	mVp-p	90		500	
<b>Transmit Disable Voltage</b>	$V_{DIS}$	V	2		$V_{CC}HOST$	
<b>Transmit Enable Voltage</b>	$V_{EN}$	V	$V_{EE}$		$V_{EE}+0.8$	
<b>Transmit Fault Assert Voltage</b>	$V_{FA}$	V	2		$V_{CC}HOST$	
<b>Transmit Fault De-Assert Voltage</b>	$V_{FDA}$	V	$V_{EE}$		$V_{EE}+0.8$	
<b>Receiver</b>						
<b>Single Ended Data Output Swing</b>	$V_{OD}$	mVp-p	200		500	
<b>LOS Fault</b>	$V_{LOSFT}$	V	2		$V_{CC}HOST$	
<b>LOS Normal</b>	$V_{LOSNR}$	V	$V_{EE}$		$V_{EE}+0.8$	

#### Notes

1. Differential between TD+ / TD-.

## IV. Optical Characteristics

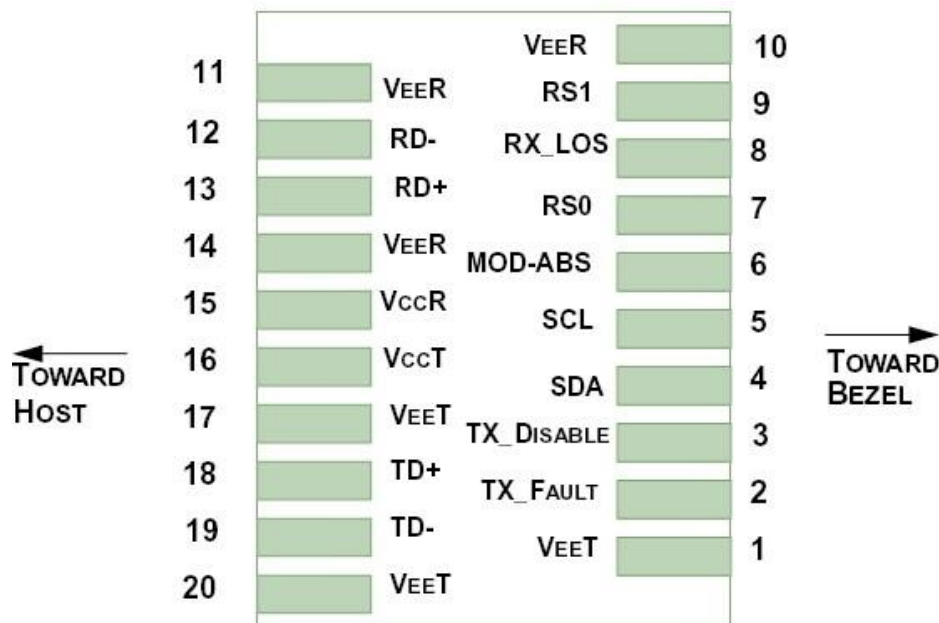
Tested under recommended operating conditions, unless otherwise noted.

Parameter	Symbol	Unit	Min.	Typical	Max.	Note
<b>Transmitter</b>						
<b>Nominal Wavelength</b>	$\lambda$	nm	840		860	
<b>Spectral Width</b>	DI	nm			0.5	
<b>Optical Modulation Amplitude</b>	POMA	dBm	-4.3		3	
<b>Optical Output Power</b>	Pav	dBm	-6.4		2.4	
<b>Extinction Ratio</b>	ER	dB	2			
<b>Transmitter and Dispersion Penalty</b>	TDP	dB			5	
<b>Average Launch Power of OFF Transmitter</b>	POFF	dBm			-30	
<b>Receiver</b>						
<b>Center Wavelength</b>	$\lambda$	nm	840		860	
<b>Average Receiver Power</b>	PAVG	dBm	-10.3		2.4	1
<b>Stressed Receiver Sensitivity (OMA)</b>	RSENSE	dBm			-5.2	2
<b>Receiver Reflectance</b>	RREFL	dB			-12	
<b>Assert LOS</b>	LOSA	dBm	-30			
<b>De-Assert LOS</b>	LOSD	dBm			-13	
<b>LOS Hysteresis</b>		dB	0.5			

### Notes

- Sensitivity for 25.78G PRBS 231-1 and BER better than or equal to  $5 \times 10^{-5}$ .
- The stressed sensitivity value in the table are for system level BER measurements which include the effects of CDR circuit.

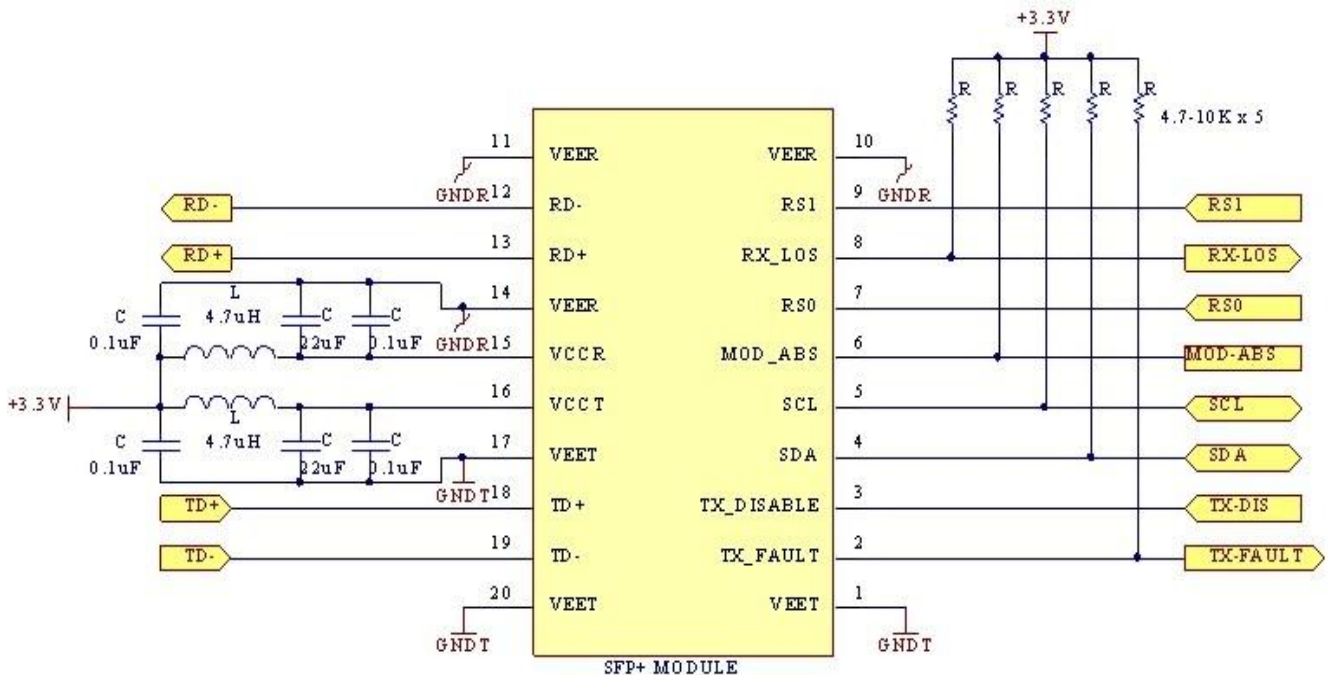
## V. Pin Function Description



Pin	Symbol	Name	Description
<b>1,17,20</b>	V <sub>EE</sub> T	Transmitter Signal Ground	These Pins Should Be Connected to Signal Ground On The Host Board.
<b>2</b>	TX Fault	Transmitter Fault Out (OC)	Logic "1" Output = Transmitter Fault Logic "0" Output = Normal Operation This Pin Is Open Collector Compatible, And Should Be Pull Up To Host V <sub>CC</sub> with A 10kΩ Resistor.
<b>3</b>	TX Disable	Transmitter Disable In (LVTTTL)	Logic "1" Input (or No Connection) = Laser off Logic "0" Input = Laser on This Pin is Internally Pulled Up to V <sub>CC</sub> T with a 10kΩ Resistor.
<b>4</b>	SDA		
<b>5</b>	SCL	Module Definition Identifiers	Serial ID With SFF8472 Diagnostics Module Definition Pins Should Be Pulled Up To Host V <sub>CC</sub> With 10 KΩ Resistors.
<b>6</b>	MOD_ABS		
<b>7</b>	RS0	Receiver Rate Select (LVTTTL) Transmitter Rate Select (LVTTTL)	NA
<b>9</b>	RS1		
<b>8</b>	LOS	NA	5
<b>10,11,14</b>	V <sub>EE</sub> R	Receiver Signal Ground	These Pins Should Be Connected to Signal Ground on the Host Board.

Pin	Symbol	Name	Description
12	RD-	Receiver Negative DATA Out (CML)	Light On = Logic "0" Output Receiver Data Output Is Internally AC Coupled and Series Terminated With A 50Ω Resistor.
13	RD+	Receiver Positive DATA Out (CML)	Light On = Logic "1" Output Receiver Data Output Is Internally AC Coupled and Series Terminated with A 50Ω Resistor.
15	V <sub>CC</sub> R	Receiver Power Supply	This Pin Should Be Connected To A Filtered 3.3v Power Supply On The Host Board. See the Recommended Operating Conditions Table.
16	V <sub>CC</sub> T	Transmitter Power Supply	This Pin Should Be Connected To A Filtered 3.3v Power Supply On The Host Board. See the Recommended Operating Conditions Table.
18	TD+	Transmitter Positive DATA In (CML)	Logic "1" Input = Light On Transmitter Data Inputs Are Internally AC Coupled and Terminated With A Differential 100Ω Resistor.
19	TD-	Transmitter Negative DATA In (CML)	Logic "0" Input = Light On Transmitter Data Inputs Are Internally AC Coupled and Terminated With A Differential 100Ω Resistor.

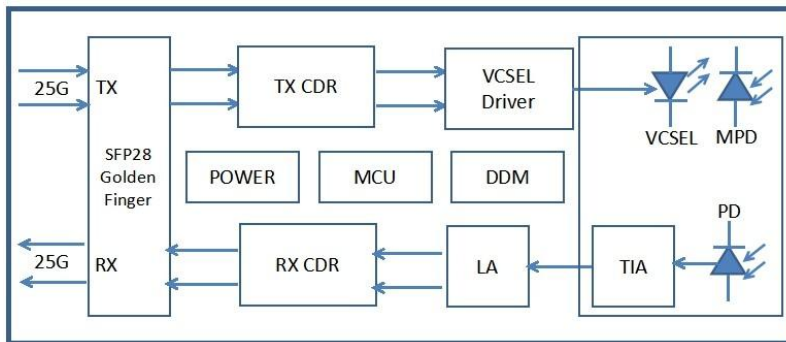
### VI. Typical Application Circuit



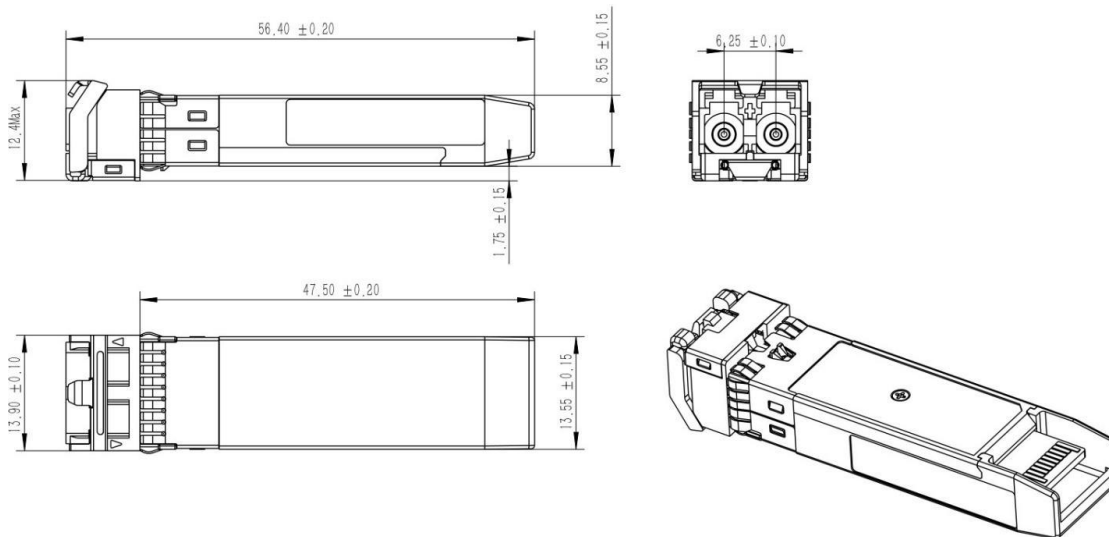
### VII. Regulatory Compliance

Feature	Test Method	Performance
<b>Lectrostatic Discharge (ESD) to the Electrical Pins</b>	MIL-STD-883C Method 3015.7	Class 1 (> 1500 Volts)
<b>Electrostatic Discharge (ESD) Immunity</b>	Variation of IEC 61000-4-2	LV 4(Air discharge :15KV; Contact Discharge:8 KV)
<b>Electromagnetic Interference (EMI) Immunity</b>	CISPR22 ITE Class B EN55022 Class B FCC Class B  IEC61000-4-3 Class 2 EN55024	Compliant with Standards  Typically Show No Measurable Effect From a 3V/m Field Swept From 80 to 1000MHz Applied to the Transceiver without a Chassis Enclosure.

### VIII. Principle Diagram



### IX. Diagram Mechanical Drawing



Unit: mm  
Unspecified Tolerance: ±0.2mm

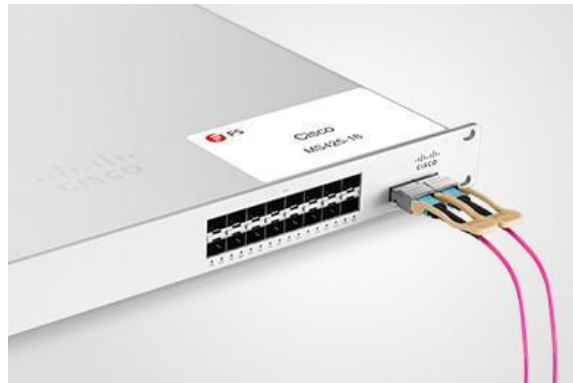
## Test Center

### I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force@tm S60-44T



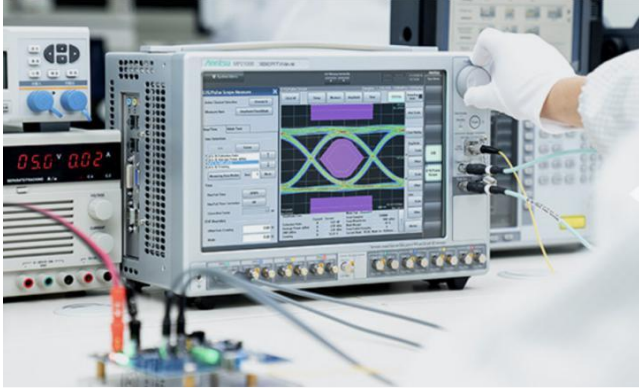
HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.



## II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



### 1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

### 2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C



### 3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

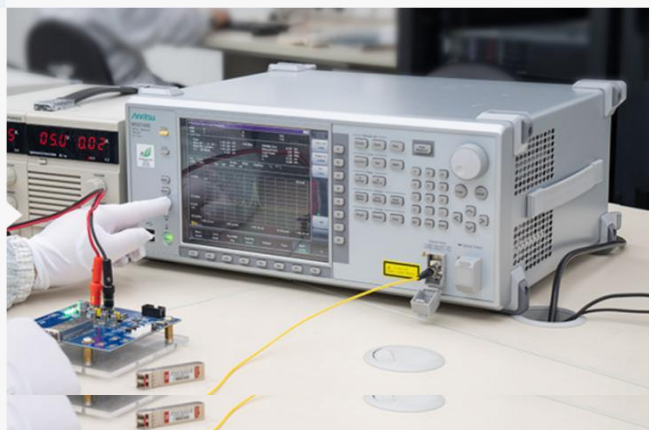
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



### 4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



## Order Information

Part Number	Description
SFP28-25GSR-85	25G SFP28 850nm 100m DOM Transceiver
SFP28-25GLR-31	25G SFP28 1310nm 10km DOM Transceiver
SFP28-25GER-31	25G SFP28 1310nm 30km DOM Transceiver
SFP28-25GER-31	25G SFP28 1310nm 40km DOM Transceiver
SFP28-25GSR-85-I	25G SFP28 850nm 100m Industrial DOM Transceiver
SFP28-25GLR-31-I	25G SFP28 1310nm 10km Industrial DOM Transceiver
SFP28-25GER-31-I	25G SFP28 1310nm 30km Industrial DOM Transceiver
SFP28-25GER-31-I	25G SFP28 1310nm 40km Industrial DOM Transceiver
SFP-10/25GSR-85	10/25GBASE-SR SFP28 850nm 100m Transceiver
SFP28-25GESR-85	25GBASE-ESR SFP28 850nm 300m DOM Transceiver



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